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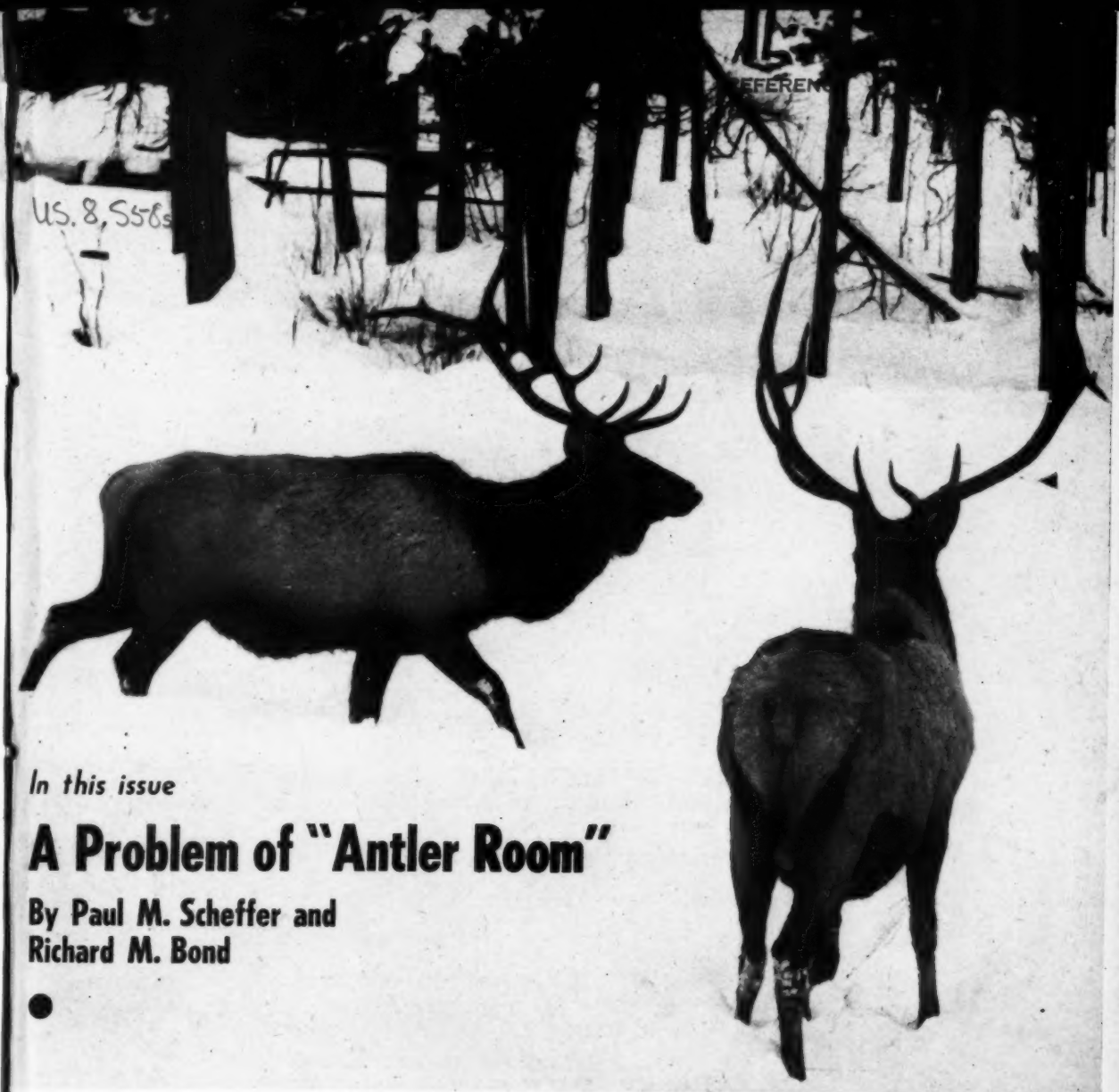

In this issue

A Problem of "Antler Room"

By Paul M. Scheffer and Richard M. Bond

JANUARY 1946

SOIL CONSERVATION

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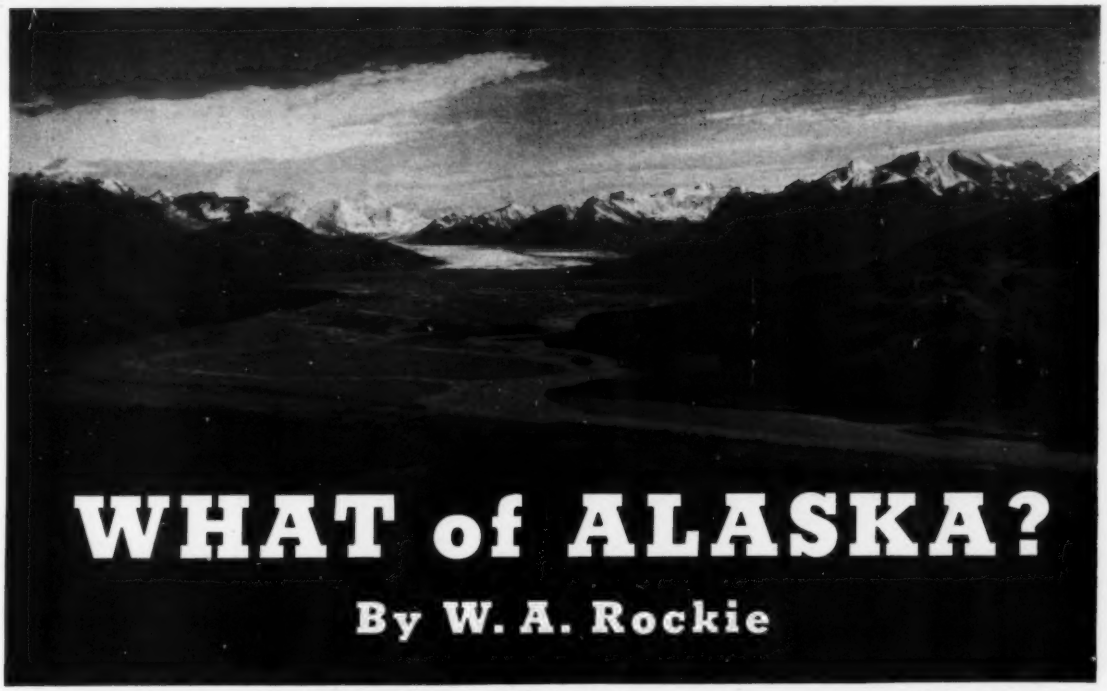
Front cover: The American elk or wapiti is one of the most popular big-game animals on western mountain-range lands. Properly managed, the elk are an asset; uncontrolled, they often become a liability. Photo by courtesy of Forest Service

SOIL CONSERVATION is issued monthly by Soil Conservation Service of the United States Department of Agriculture, Washington, D. C. The matter contained herein is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, with the approval of the Director of the Budget. SOIL CONSERVATION seeks to supply to workers of the Department of Agriculture engaged in soil conservation activities, information of special help to them in the performance of their duties. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., 10 cents a copy, or by subscription at the rate of $1.00 per year, domestic; $1.50 per year foreign. Postage stamps will not be accepted in payment.



WHAT of ALASKA?

By W. A. Rockie

Looking southeastward from tillable Matanuska Valley lands (area 15) into rugged terrain which typifies the Chucach and other mountain ranges of southern Alaska (area 15) beneath the camera and area 14 in the distance.

FARMING in Alaska involves some specific handicaps. A few of these difficulties are not common in the United States. For instance, the ever-frozen subsoil in most of Alaska has no counterpart in the States. In southern Alaska this feature is generally lacking, but in central Alaska it is everywhere. Winter in Alaska usually begins and ends with a bang not typical in lands farther south.

Wherever green vegetation covers the land it tends to hold back the water and thus make the land wet. The vast extent of such wet land makes mosquitoes and flies a constant torment during the growing season to both man and beast. The short, dark days of winter are intolerable to some people while others value these months as a time for rest and sociability.

A tale of two families who together planned and moved to Alaska shows that one's attitude is the all-important factor in success or failure.

Two skilled tradesmen, co-workers in Seattle, heard, in 1937, that some large jobs in their particular field were contemplated in a certain Alaska community. Accordingly, they decided to close out their small holdings in Seattle and move to Alaska. They did so, arrived there in February 1938. Each family had more than $2,000 cash reserve. They had guarded their information concerning work opportunities rather carefully and selfishly and discussed their plans neither with their Seattle friends nor with fellow-travelers en route north.

They experienced a severe and unexpected shock when they found, upon arrival, that they had been misinformed regarding skilled work in their line. There was no such work to be found, either in that community or in any other part of Alaska. These families each consisted of man and wife only. Mr. and Mrs. A were approximately 50 years old, Mr. and Mrs. B were in their thirties.

The shock of disappointment affected the two families differently. Mr. A immediately obtained a job as night watchman, while his wife soon found an unoccupied house in sad disrepair on the edge of town. Together they located and consulted the owner of this property. The owner agreed to furnish all the material for reconditioning the house and in return for their labor, he

NOTE.—The author is regional chief, project plans division, Soil Conservation Service, Portland, Oreg.

agreed to give them 2 years of free rent. The A's moved into the house "as it was." The property included several acres of land, and they planted a large garden.

At the end of a year and a half, this couple's original capital still was intact, and there was half a year's free rent coming. On the pantry shelves were hundreds of quarts of canned vegetables and fruits from the garden and the adjoining woods. Last, but not least, in the 1½ years the A's had saved more than $800 from wages and sales of vegetables.

Mr. and Mrs. B tried to place the blame for misinformation upon somebody—anybody, and they sat down to wait for work to come. Naturally, no work found them and they just rested in their apartment (and apartments are expensive anywhere in Alaska). At the end of a year and a half they had spent practically all of their reserve, nothing had been coming in. Words cannot adequately express (1) Mr. and Mrs. B's disgust and dissatisfaction with Alaskan conditions, people, and opportunities, or (2) Mr. and Mrs. A's praise of identically the same conditions, people and opportunities.

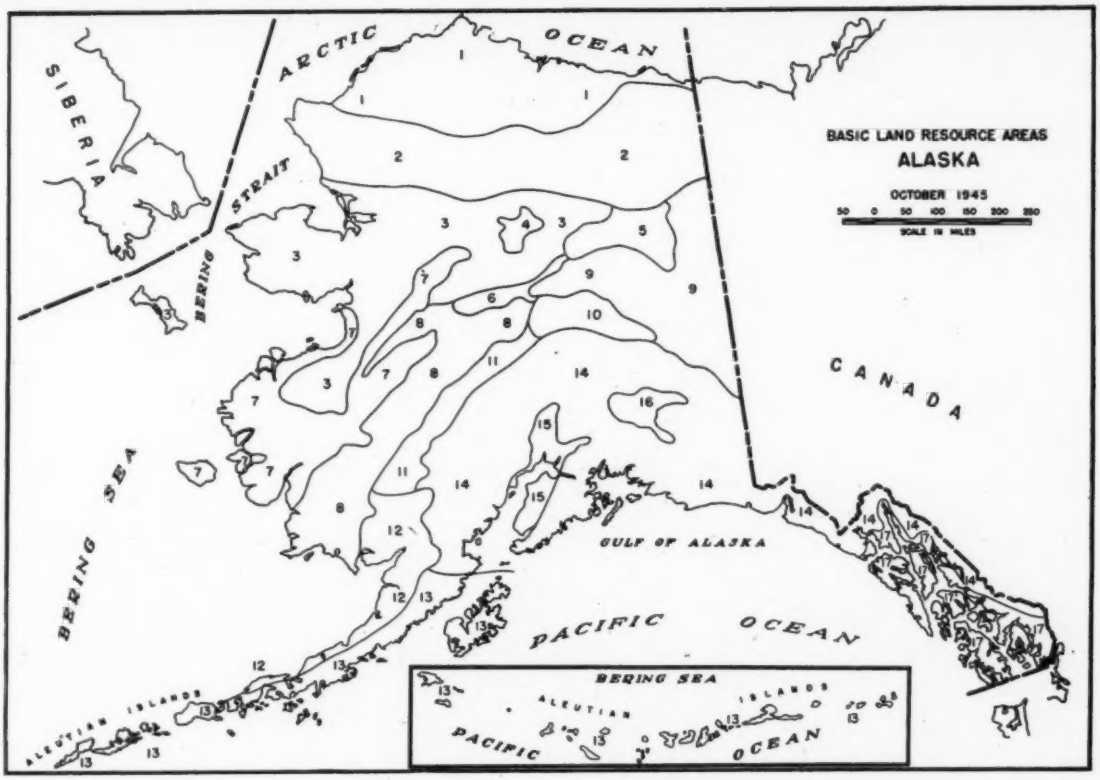
The Matanuska Valley includes level tillable lands such as those already developed in this picture.

The A's and B's came to Alaska together and they found themselves in the same predicament. The A's worked and succeeded while the B's shouted calamity and failed. Industry, will to succeed, attitude and ambitions accounted for the success which ensued on the one hand and the failure which resulted on the other.

Hundreds of magazine and newspaper articles and a few Government bulletins on Alaska's agricultural possibilities have been written since 1940. Most of them use the long-standing estimates of more than 60 million acres of potential farmland, but none has shown even vaguely where these farmlands are located.

I have tried, on several occasions, to determine where these sixty-odd million acres are located. I have been utterly unable to place them on any map. I do know where a few million acres lie,

Matanuska Valley also contains poorly drained land (foreground) and rough, hilly land (center) unsuited to farming. Rough mountains lie to north, east, and south.



and the main purpose of this article is to designate them specifically.

The major part of today's farming in Alaska is in or near the Matanuska Valley in southern Alaska. However, this entire valley contains only a few hundred thousand acres, most of them not tillable.

My own information is based on extensive soils, topographic and climatologic studies in all sections of the Territory. In 5 different years I traveled more than 3,000 miles on foot, 15,000 miles by auto over all Alaska's prewar roads. I covered 8,000 miles by boat on its waterways, and 12,000 miles by airplane.

Don L. Irwin, for 12 years superintendent of the Matanuska Agricultural Experiment Station, and W. T. White, who had charge of agricultural experiments at Fairbanks, Matanuska, and Kodiak for nearly 15 years, assisted me in preparing the estimates.

In this brief article I shall undertake to:

(1) Compare the size of Alaska with lands we know better.

(2) Divide its area into parts which I have designated as basic land resource areas.

(3) Describe very briefly each of these 17 basic land resource areas.

(4) Indicate in which of these areas the potential farmlands are located.

The Territory of Alaska is about one-fifth the area of the United States, but its islands and mainland are so scattered and shoestringed that its overall length and breadth are almost as large as the length and breadth of the entire United States.

However, if Alaska's tails were blocked in solid, its area would be equal to that of Washington, Oregon, California, Idaho, Nevada, and about two-thirds of Utah.

For purposes of examination, I have carefully subdivided Alaska into 17 different parts which are designated here as basic land resource areas. A brief description of each area follows:

1. ARCTIC LOWLANDS

(53,800 square miles—roughly the size of Iowa)

This area has such severe climatic conditions that its entire acreage is classed as nonagricultural. The handi-

caps of agriculture are so great here that even gardens are not considered feasible.

2. BROOKS RANGE

(79,000 square miles—roughly the size of Idaho)

This area also has sufficiently severe climatic conditions that its entire acreage is classed as nonagricultural. It contains more locations of producing gardens than do the Arctic Lowlands. It is classed as entirely nonagricultural first because of the unfavorable climate and second because most of the area has mountainous topography.

Individual small home gardens exist at some locations within the area, but their total acreage, either now or in the future, appears destined to remain negligible.

3. ARCTIC CIRCLE UPLANDS

(70,500 square miles—roughly the size of Oklahoma)

Although the climatic conditions are not quite so severe in this area as in Nos. 1 and 2, they, combined with rough topography, preclude the likelihood of any great agricultural development. Some gardens of hardy vegetables are currently grown in this area, but the total acreage of land so used is quite negligible. It is estimated that not more than 5,000 acres would lend itself to agriculture.

4. ALLAKAKET LOWLANDS

(3,100 square miles—roughly 1½ times the size of Delaware)

Some of the valley lowlands in this area are sufficiently warmed in the summer for a considerable variety of hardy garden vegetables to be successfully grown in most years.

However, since most of the acreage is mountainous or rough hilly land, relatively little total acreage will be cultivated. A larger acreage might prove to be successful grazing land. It is estimated that not more than 10,000 acres can be used for agriculture.

5. UPPER YUKON BASIN

(11,200 square miles—roughly the size of Maryland)

Climatically this area is not materially different from the preceding area, but since most of it consists of alluvial land or extensive rolling hills, under heavy population pressure it could possibly undergo major agricultural development. However, an extremely limited development appears more probable even under such conditions. It is estimated that not more than 215,000 acres would be agriculturally used.

6. MIDDLE YUKON BASIN

(4,700 square miles—roughly the size of Connecticut)

The potential tillable lands in this area are benches along the Yukon River, which while having a winter climate practically as severe as in the preceding areas, has more summer warmth than nearer the coast. Very little of these benchlands are suited to tillage without intensive land preparation, particularly drainage. It is estimated that not more than 6,000 acres would become agricultural.

7. LOWER YUKON BASIN

(47,500 square miles—roughly the size of Mississippi)

Most of these lands are low-lying tundra areas, development of which may be possible, but is believed to be most improbable. There is a scattering of lands having agricultural possibilities, but my estimate puts them at not more than 300,000 acres.

8. OPHIR-IDITAROD UPLANDS

(44,200 square miles—roughly the size of Pennsylvania)

This area includes rolling hills and mountains as well as extensive level plains. However, because of highly unfavorable climatic conditions, generally rough topography, and the well-nigh universal tundra of the arctic, very little agricultural development within this area seems probable. It is estimated that such land use would not exceed 27,000 acres.

9. YUKON-TANANA UPLANDS

(41,600 square miles—roughly the size of Ohio)

Most of this area consists of rolling to hilly uplands, some of which may become grazing lands for domestic livestock. Some of the more level and gently sloping portions might be farmed. It is estimated that not more than 2,660,000 acres would be agriculturally used.

Both farming of cultivated lands and range production of livestock appear to be definite possibilities in this area.

10. TANANA VALLEY

(9,300 square miles—roughly the size of Vermont)

This area consists mainly of the glacial outwash deposits which typify the Tanana Valley. The climate is severe in winter, but the chief handicaps to agricultural development appear to be gravelly land and inadequate drainage. Nearly all of the lands are swampy and my estimate is that not more than 300,000 acres will be used for any phase of farming.

11. KUSKOKWIM VALLEY

(13,900 square miles—roughly half the size of Maine)

This is a lowland paralleling the northwesterly edge of the Alaska Range. It is traversed for half its length by the Kuskokwim River. Inadequate drainage is the chief obstacle. In addition, the winters are truly severe. It is estimated that not more than 450,000 acres will be agriculturally used.

12. BRISTOL BAY LOWLANDS

(19,300 square miles—roughly two times the size of New Hampshire)

This extensive area, chiefly lowlands, is very poorly drained and offers little promise of agricultural development. My estimate is that not more than 125,000 acres will be used for farming.

13. ALEUTIAN RANGE

(27,600 square miles—roughly the size of South Carolina)

The chief handicap to major agricultural development in this area is the mountainous topography. It is generally so rough that any sustained use of the land, even grazing, is out of the question. The temperature is sufficiently equitable, however, that livestock growing might

View southward across the Matanuska Valley toward Pioneer Peak from Palmer (foreground). Photo by courtesy of Pacific Aerial Surveys.

eventually occupy a minor acreage of this island chain. It is estimated that not more than 875,000 acres will be so used.

14. ALASKA ICE CAP

(124,000 square miles—roughly the size of New Mexico)

This area, which includes nearly one-fourth of all Alaska's acreage, consists chiefly of the roughest mountainous expanse on the North American continent. Since, however, its fringes are broken by innumerable shoestring valleys in which the climate is relatively mild and its mass of high altitude mountains encloses occasional basins having some agricultural potentialities, it is estimated that as much as 800,000 acres might eventually be so used.

15. COOK INLET LOWLANDS

(7,900 square miles—roughly the size of Massachusetts)

This area, of which the Matanuska Valley is a part, holds the greatest promise for agriculture in the entire Territory. It is estimated that as many as 1,000,000 acres may be developed for farming purposes.

16. COPPER RIVER BASIN

(53,300 square miles—roughly the size of Connecticut)

This area looks better to the eye than studies to date indicate it actually is. Frostiness is the chief handicap but this may not be prohibitive. It is estimated that as much as 175,000 acres might be used for farming and livestock production.

17. SOUTHEAST ALASKA FIORDS

(23,400 square miles—roughly the size of West Virginia)

Except for an occasional narrow alluvial valley this area is as rough and precipitous as any on the continent. Generally mild and equable climatic conditions favor the use for agriculture of all areas in which topography and soil are suitable. These are limited to the floors of the narrow dissecting valleys. It is estimated that as much as 150,000 acres may be expected to become agricultural.

All that these estimates are meant to portray is whether the development is of major or minor character. This study establishes definitely that major farming developments will center primarily in area 15. A second major farming and livestock producing center probably will develop in the vicinity of Fairbanks (areas 9, 10, and 11). A third, smaller center of dairy, beef cattle, and sheep production may develop at Kodiak (area 13). It is possible that a livestock center might

possibly spring up in the Copper River Basin (area 16). Major developments in the other 11 areas are out of the question for one reason or another. Shoestring and checkerboard farms do occur in most of these other areas, but the development of extensive agricultural land-use is impossible.

The seven million odd acres of land which apparently are suited to agriculture classify as to capabilities approximately as follows:

ESTIMATED ACREAGE OF AREA IN EACH LAND CAPABILITY CLASS

When land can be used by simply clearing and/or cultivating

(000 omitted)

	I	II	III	IV	VI	VII	VIII	Total
1. Arctic Lowlands	0	0	0	0	0	0	34, 432	34, 432
2. Brooks Range	0	0	0	0	0	0	50, 560	50, 560
3. Arctic Circle Uplands	------	------	1	1	2	1	45, 115	45, 120
4. Allakaket Lowlands	------	2	2	2	2	2	1, 974	1, 984
5. Upper Yukon Basin	------	40	35	35	70	35	6, 953	7, 168
6. Middle Yukon Basin	------	1	1	1	1	2	3, 002	3, 008
7. Lower Yukon Basin	------	30	30	30	120	90	30, 100	30, 400
8. Ophir-Iditarod Uplands	------	3	3	3	10	8	28, 261	28, 288
9. Yukon-Tanana Uplands	------	0	265	0	1, 065	1, 330	23, 964	26, 624
10. Tanana Valley	------	60	60	60	60	60	5, 652	5, 952
11. Kuskokwim Valley	------	90	90	90	90	90	8, 446	8, 896
12. Bristol Bay Lowlands	------	25	25	25	25	25	12, 227	12, 352
13. Aleutian Range	------	175	175	175	175	175	16, 789	17, 664
14. Alaska Ice Cap	0	160	160	320	160	0	78, 624	79, 424
15. Cook Inlet Lowlands	50	100	150	200	400	100	4, 056	5, 056
16. Copper River Basin	------	35	35	35	35	35	3, 217	3, 392
17. Southeast Alaska Fiords	------	30	30	30	30	30	14, 826	14, 976
Total for Alaska	50	751	1, 062	1, 007	2, 245	1, 983	368, 198	375, 296

(Classes I to IV are four qualities of tillable land. Classes VI and VII are two qualities of grazing land. Class VIII is considered unsuited to any agricultural use. Class V is established in theory; in this study it was not used.) From these estimates, the tillable area totals 2,870,000 acres, and the rangeland area totals 4,228,000 acres. Complex problems of land use are certain to arise on all of these lands, and some of them may be peculiar only to Alaska.

After cutting the Territory into 17 pieces, studying the potentialities and capabilities of each segment and then adding up the results, I am forced to conclude that the area of land really suited to agriculture in Alaska is much less than the long-standing estimates have indicated.

I could conscientiously make larger estimates by giving my wildest imagination full rein and making myself believe that all drainage problems on Alaska's lands can be easily overcome. On that imaginary basis, I prepared an alternative set of estimates. In those portions of the Territory in which climate and precipitous topography present the chief handicaps, even imagination permits little change in one's conclusions.

In some of the vast plains and valleys, however, the potentialities would be multiplied many times. On such a basis, these enlarged estimates—which I consider badly founded—raise the 7,098,000 acres of potential agricultural land to 58,605,000 acres.

Most of the potential farming lands are still inaccessible to any existing transportation, even in areas 15, 9, and 13, where the most immediate probabilities and most inviting lands are situated. Farming development in Alaska will largely follow transportation. It will not often precede transportation as it so often did in the United States, chiefly because of the greater difficulty of building and maintaining roads under the prevailing soil, climatic and drainage conditions. However, if Alaskan settlement is to succeed even in the face of some of the problems of land settlement and development which has handicapped agriculture here in the States, adequate classification of the land and its capabilities should be provided in advance. Naturally, proper land use should follow.

The Federal and Territorial Governments are deeply concerned with the proper settlement and development of these lands. They are the only remaining extensive areas in continental United States where the American pioneer's home-build-

(*Continued on page* 160)

The Matanuska Agricultural Experiment Station (right center) is assisting farmers to establish permanent, profitable agriculture. Palmer, seen directly beyond the station, is about 6 miles away.

Palmer, in 1940, looking northeast. The privately owned and privately built town occupies the foreground; Government constructed buildings lie on the other side of the track. Additional construction is beginning in 1945.

Planning for Soil Conservation

By HUGH BENNETT, Chief, Soil Conservation Service

IN THE United States we have learned that we must have soil conservation if we are to have continuous, abundant agricultural production. And we have learned, too, that it must be efficient conservation—the kind that will keep our land permanently productive.

In turn, soil conservation requires intelligent use and maintenance of our land resource. This may mean contour cultivation and terracing to hold soil and conserve rainfall. It may mean seeding grass or planting trees to meet the needs of bare, steep slopes or shallow soil. It may mean changing a rotation to increase soil productivity, and so on.

First of all, however, soil conservation requires a plan—a workable, practical layout of the farm, showing what needs to be done and what can be done in every field, pasture, and wood lot of the farm.

Such a plan can be developed best with a map of the farm that shows (1) the location of the various soils, (2) the slope of the land, (3) the degree and extent of erosion, and such features as field and pasture boundaries, areas of grassland and woods, fences, streams, gullies, roads, cattle lanes, and buildings. The complete plan must show which fields require strip cropping or terracing; which lands need to be planted to trees or hay crops and which should be kept in pasture; where dams should be built across gullies; and where waterways must be installed for safe disposal of excess rainfall.

Planning in this way for the development of soil conservation farming is like making a plan to guide the building of a house, or the drawing up of specifications for digging an irrigation ditch or installing a fishpond.

The Way to Land Security.—Through its Nation-wide program of work on the land in cooperation with soil conservation districts, the Soil Conservation Service has led in the development and application of new and improved measures for the control of erosion, conservation of rainfall, and improvement in land use. The Service is helping individual farmers and ranchers, as well as groups of farmers and ranchers, to adopt these practical measures over the widest possible area, and to solve other problems relating to the maintenance of soil productivity.

The Soil Conservation Service is not a lending agency and makes no benefit payments of any kind to farmers. Essentially, it is a corps of trained, experienced specialists in land, plants, animals, and land use, organized to work cooperatively with farmers out on their land, chiefly by supplying technical assistance, all the way from planning the work to helping with its application and maintenance. And, too, the Service carries on, in cooperation with the States throughout the country, a program for the development of new and better methods of conservation and for getting immediate, practical answers to questions that constantly are arising in connection with the operational program.

If there were some standardized, simple remedy for the ills of the land that could be applied indiscriminately, the job of soil conservation would be comparatively easy. But there is about as much variety in soil, in erosion, and in the performance of water and wind and plants, as in the landscape of the country. Control methods that work wonders in gully torn cotton country may do more harm than good on the dusty wheatlands of the Great Plains. And many of those quite practical on the high-yielding corn lands of the Midwest may not be applicable to the dairy and vegetable lands of the Northeast. Even on neighboring farms, and often in the same field, land problems are almost never completely identical. And in those localities where much of the precipitation is in the form of snow, special measures are required to safeguard farm and range land. In short, the soil and water conservation program must be sufficiently flexible to meet all the possible conditions and needs.

The specific land treatments used and recommended by Service technicians may therefore vary from one valley to the next, from farm to farm, and even from field to field. Before any work is done, each farm or ranch is carefully analyzed, both as a piece of land and as a business enterprise.

In making a physical analysis to determine productivity, needs, etc., field men of the Service carefully note, on the ground, the exact lay of the land, the quality of the soil, the degree of erosion damage, and the prevailing erosion hazards on every acre of every field, woodlot, and pasture over the

entire farm. As accurately as possible, these conservation technicians determine which lands can be cultivated under good farm practices without excessive loss of soil and rainfall, and at reasonable cost in labor and material; which lands need the protection afforded by special crop arrangements, special tillage practices, or structural installations; and which ones require a permanent cover of trees, grass, or other protective vegetation. In those localities where irrigation is practiced, specialists are even sent every year into the snow-bearing mountains of the upper watersheds to determine how much water the farmers in the valley below may count on for their seasonal plantings when the deposits of snow melt.

The next step is to work out with the farmer a farm plan for practical operation, based on the ground information acquired and translated into eight simple land-capability classes.[1] This the soil conservation technician does, not indoors around a table, but out in the fields, pastures, woodlots, gullies, and abandoned and idle areas, working along with the farmer himself—with all the pertinent facts immediately at hand for full and understanding consideration.

In some cases, the new arrangement, based on the physical aspect and needs of the land, may not entirely fit the farmer's pocketbook. It may call for more hay crops than he actually needs or can sell and not enough potatoes or corn or wheat; it may propose other changes the farmer cannot afford to make. If so, it is not a good arrangement in a practical sense, and it must be adjusted, if possible, to meet family needs and market opportunities—and the farmer's personal preferences. Purely from the conservation standpoint, however, the farm arrangement based on physical land analysis is ideal. The closer the farmer can approach it and still make a good living, the more stable and productive his land will be, and the surer his income, over the long run.

Drawing up a satisfactory land-use and land-protection plan for a farm is only half the job—or less. The other half involves the actual application of the plan to the land.

Each parcel of land generally needs some special practice or treatment for adequate protection and maximum production. But so far as can be done safely the farm plan is made flexible to allow some choice of crops to be grown or methods to be used. Steep or unproductive croplands, for example, may be earmarked for a permanent cover of grass or legumes, or trees; farm woods may be planned where grass is not paying out or is failing to hold the soil, and vice versa; gullied areas may be turned into grass-covered waterways, or farm sanctuaries for animals and birds, or valuable pastures of kudzu.

Croplands generally should be farmed in rotation, as nearly on the level as may be practicable, and sometimes in strips. On the more erodible slopes, terraces or diversion ditches are frequently needed for added protection. Pastures often need to be contour-furrowed, limed, fertilized, cleared of weeds before the seed mature, and grazed with caution to improve the growth of grass. Woodlands need to be fenced to keep out livestock, and they need to be protected from fire and managed according to scientific principles of forestry. These are only a few of the dozens of erosion-control practices that may be called into use to fit particular situations.

Advent of the Soil-Conservation Survey.—A short time before the establishment of the Soil Erosion Service (September 19, 1933) Glenn Fuller of the Georgia Agricultural College and the author worked out a tentative method for mapping the effects of soil erosion. Primarily, the method was based on a classification of land types—not soil types. These classes were determined by soil, slope, and degree and kind of erosion. The surveys made at the time showed not only these physical factors but also the broader types of land use. The first work was done in the old plantation belt of the Piedmont section of Georgia, starting on February 9, 1933.[2]

Here was the first attempt on an extensive scale to classify and map erosion conditions in their relation to other physical characteristics of the land, its agricultural capacity and its conservation needs. It was also the first time erosion had been mapped under a system which classified both erosion and slopes by types. This information, which should have been available long before, immediately provided the basis for a much better understanding of soil erosion, and the land itself.

The most important result, however, was that this new kind of survey proved extremely useful in planning for the application of complete soil conservation operations, both for erosion control

[1] See Soil Conservation, December, 1945.

[2] Georgia Land Use Problems. Georgia Experiment Station, Bulletin 191, May 1935.

and for bringing about needed, scientifically balanced land-use adjustments, on entire farms. The Soil Conservation Service subsequently adopted this system of survey as a basic tool of its integrated action program on the land, and has continued to use it—with occasional refinements.

So it was that in 1939, for the first time in the history of our country, we began producing simple maps—generally showing no more than eight land classes, or land-use capability classes—as a basis for planning soil and water conservation. The classes range from land of such favorable quality and condition as to require no special treatment for sustained use and for adequate protection against erosion, through land that requires a variety of treatments for efficient and safe cultivation, to land that should never be cultivated under any circumstances.

The foregoing is no more than the barest outline of this new and comprehensive type of survey—*the land-capability survey*—which is receiving the widespread approval of farmers and soil and water conservationists throughout the country.[3] It is just the kind of survey we need in soil conservation operations and land repair work.

Mention should also be made here of the Nation-wide reconnaissance of erosion carried out by the Service in 1934 and 1935. Previously a partial and very general survey of erosion conditions over a large part of the country was made by the author,[4] but it lacked detail, both with respect to classification and distribution of erosion. Until the 1934–35 reconnaissance erosion survey was made (published by the Soil Conservation Service, 1935) there was no source of information in existence that showed in any adequate way the general extent and distribution of erosion throughout the United States.

Special Planning Conditions.—Regional variations in land conditions, climate, and type of farming quite naturally have an influence on conservation planning. In the great livestock range areas, for example, soil conservation takes a somewhat different form than in the farming regions. In range areas, less emphasis is normally placed on basic shifts in land use; and stress is more along the line of protection and improvement of grass through careful management of livestock. Fundamentally, however, the conservation plan on a western ranch is like that on an eastern farm. It is a combination of good land use, appropriate management of land and grass, careful conservation of rainfall, and adequate soil defense, based on the inherent needs and adaptabilities—as well as the man-induced conditions—of every single acre.

Planning for conservation on farms where drainage is an important requirement calls for careful consideration of upstream conditions. For example, where open ditches are the best means for draining wet lands, every effort should be made to control erosion on the entire watershed contributing run-off to the drainage canals and ditches, so as to reduce silting to a minimum. This can be done much easier where the watershed lies within the boundaries of a single farm than where it reaches into several farms. Situations of this latter kind necessitate group planning, if a good job is to be done.

In areas of irrigation farming, provision must be made for the safest and most effective application of water, in order to control erosion and avoid water-logging, "scalding," and waste of water. Also, waste water must be carefully handled to prevent damage to lower-lying lands. Often this can be done advantageously by spreading such run-off over pasture lands or meadows. A good drainage system, installed before irrigation begins, should be a part of all irrigation projects whether a single farm is involved or many farms.

In some localities the soil is so shallow over bedrock that unusual measures are necessary. Sometimes rock lies so near the surface of eroding fields, where it may not be feasible to turn the land over to grass or trees, that blasting is required to provide adequate terrace-channel depth. Exceedingly accurate engineering specifications are called for under such conditions.

Planning for stock-water ponds calls for careful consideration of hydraulic data in order to assure the inclusion of a watershed large enough to provide adequate run-off to keep the reservoir supplied with water. Water-spreading operations, diversion dams, and irrigation of rice fields also require the most accurate information obtainable in order to avoid costly or inefficient installations.

In regions where wind erosion is prevalent, it is important to study the possibility of using windbreaks or grass on critical areas. Consideration

[3] Classifying Land for Conservation Farming. Farmers' Bulletin 1853, U. S. Department of Agriculture, 1943.

[4] The National Program of Soil and Water Conservation. Jour. Am. Soc. of Agronomy, vol. 23. May 1931.

must also be given to the utilization of crop residues, flexible cropping systems, and so on.

In certain glaciated regions, hummocky or hillocky topography sometimes prevents satisfactory use of such measures as terracing, strip cropping, and contouring. Under such conditions, it may be necessary to provide as much grass agriculture as possible, together with stubble mulching and the growing of small fruits.

Peat lands and peaty-muck lands are so susceptible to burning in dry seasons that every consideration must be given to maintenance of the water level, by pumping and other means of lowering and raising the ground-water level, in order to control fire. The growing of shallow-rooted crops is frequently called for on such lands.

Whatever the condition or the region, the end product of soil and water conservation planning is an arrangement of fields, pastures, meadows, and woods that safeguards the soil and fits the land according to the requirements of Nature. It constitutes an adjustment in land use most nearly meeting the requirements of the physical environment. Together with the adapted conservation practices, it makes up the complete farm plan for soil and water conservation. Under such a plan, soil conservation is not just an incidental bit of the mechanics of farming; it becomes part and parcel of the whole business of making a living from the land.

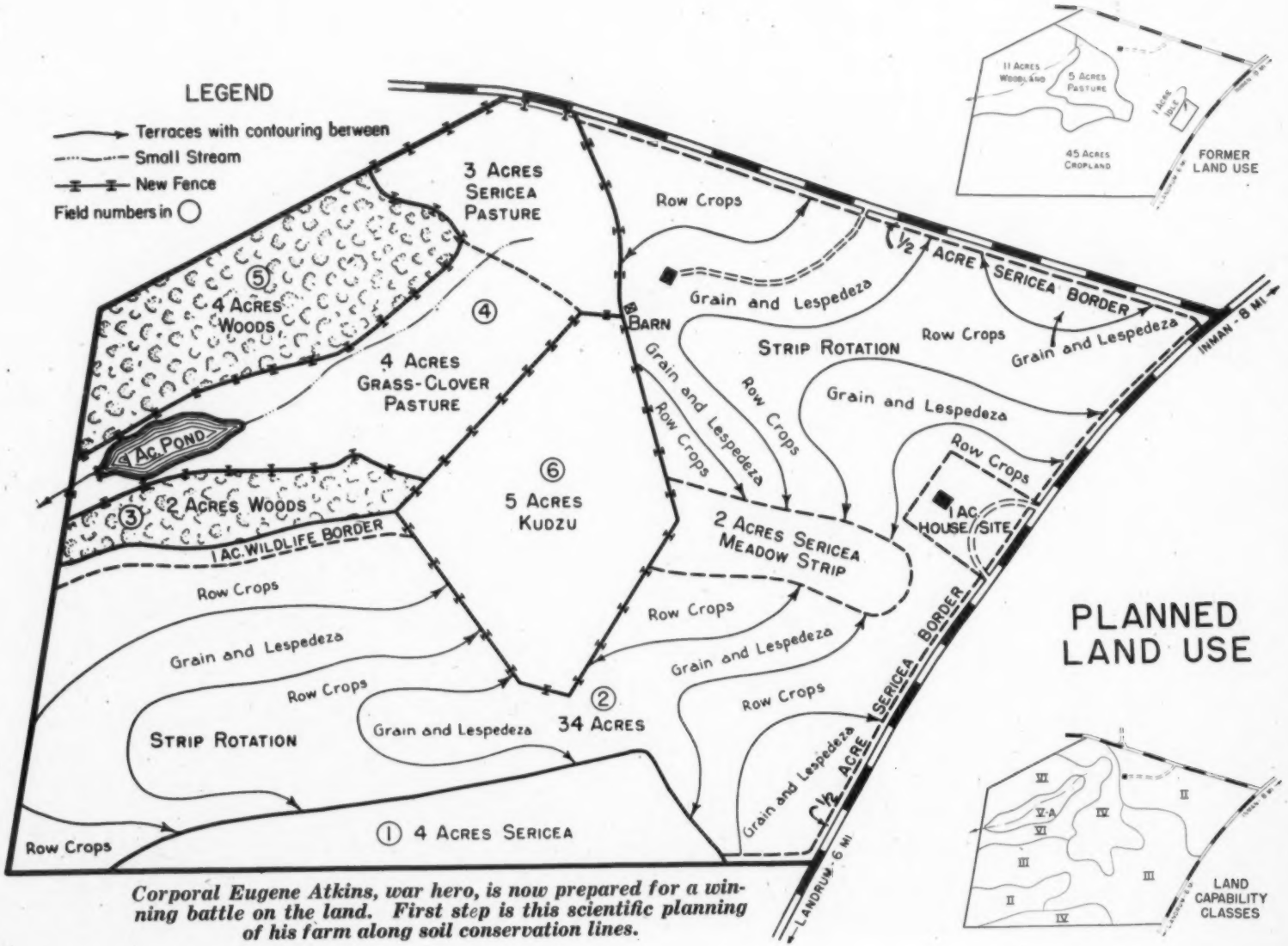
Only with such a plan can we get real soil conservation on the land. And only with real soil conservation can we have permanently productive land for a permanent agriculture capable of supporting a permanent nation. *There are no shortcuts, no panaceas, no alternatives to soil conservation; it must be done as I have pointed out here, or it fails. This is not a matter of opinion, but one of physical facts imposed upon the land by Nature.*

Conservation Group.—One of the most promising aspects of the productive capacity of soil conservation districts for getting permanent soil conservation applied on the land is the peculiar adaptability of the districts for utilizing the advantages of group action. This enormous potentiality for getting effective work done, not only in planning but in applying conservation plans to farms, and maintaining the work, is being taken advantage of more and more. The excellent results we have had through this medium speaks strongly for its further use on a rapidly increasingly scale.

One of the early widespread uses made of the conservation-group system was that employed with a very high degree of success in getting more farmers started on soil conservation work through our program of "widespread practice" at the beginning of the war. Some 10,000 group schools were held during winter and at other opportune times of the year, under this plan. Meetings were held in schoolhouses, churches, farm homes, even in barns and out-of-doors, attended usually by from 6 to 12 or more farmers or ranchers of compact localities, communities, neighborhoods, drainage basins, forks-of-the-creek, school districts, townships, and other localities. Technicians of the Soil Conservation Service met with these conservation groups and explained the simpler kinds of work that farmers without much experience in soil conservation operations could take hold of and go ahead with during the period of war-imposed scarcity of manpower, gasoline, tires, and trucks, while waiting for further essential guidance by the technicians.

This intensive effort during the course of a single year, resulted in getting one or more soil conservation practices in operation on more than 400,000 farms throughout the United States—and, incidentally, contributed much, in conjunction with the other regular soil conservation work, to the splendid achievement of the farmers of the country in supplying the Nation and its armed forces with the increased amounts of food called for by the war. This local type of farmer cooperation has been extensively used in the districts' work for pushing ahead with the regular cooperative program of the Service in planning, putting plants into operation, and maintenance.

In conservation-group planning work, technicians explain the land capability classes to farmers and ranchmen, showing how they help work out the necessary blueprinting of farms and ranches for soil and water conservation operations. Supplied with land-capability maps of their farms, made by the conservation-surveyors, many operators are going ahead with some of the preliminary work in planning their lands for operations. Soil conservation technicians, visiting the farms after such preliminary work by the farmer, are thus aided in speeding up both planning and operational activities. The farmer thus comes to understand better what complete and permanent soil conservation is and how it applies to his own farm or ranch. And often his enthusiasm for getting along with the work is increased—and this helps, too.



Corporal Eugene Atkins, war hero, is now prepared for a winning battle on the land. First step is this scientific planning of his farm along soil conservation lines.

He works with his neighbors. Grassed waterways and ditches are serving two or more farms, terraces cross farm boundaries, farmers are putting grass and clovers on land where they are suited and leasing grazing they do not need to their neighbors, and neighbors are swapping work to get conservation farming under way. And the tax base is being preserved.

It is impracticable to give here anything like a detailed account of how group planning, group discussion, group enthusiasm, and group relationships are developed, enlarged, and spread about through these neighborhood activities. I just recently (November 1945) talked briefly with a farmer—Mr. Charles Swofford of Gaffney, S. C.—in the Midway community of the Broad River Soil Conservation District, who had been selected by the forty-odd farmers of the neighborhood as group leader. He told me that the farmers of his community were meeting rather frequently at convenient places for discussions on soil and water conservation matters, "* * * and sometimes we get people to come in to talk to us, show us moving pictures, and so on."

"Something over 26 farmers now have soil conservation work pretty well established on their farms, and some work has been done on nearly 40 farms of the neighborhood. Some absentee land ownership and shortages of labor and machinery have held work back somewhat.

"This community work has helped the district get applications from farmers to do soil conservation work on their farms—and I mean good, live applications, from farmers who mean business.

"At our community meetings farmers are told just what a farm plan is, so they will understand that it is a practical guide for using land according to its proper use, or ability to produce, and for treating the land according to its needs, within the farmer's economic ability.

"This kind of working together is making us talk more with one another about our farming matters than we used to in the neighborhood. Now any farmer in the Midway section will advise any other farmer about this or that, where formerly we just didn't work together that closely. It's doing a lot for us; we are getting the work done and we like it. Our crops are better and the soil is staying in the fields, getting better in many of them."

Regretfully I had to leave Mr. Swofford at this point; for we were rapidly getting down to brass tacks. However, on leaving I drove through Midway and saw what was going on. It was an amazing sight. Good soil conservation spread out before us across the landscape: Terracing, strip cropping, contouring, crop rotations, waterways safeguarded with sericea lespedeza—and a bale and a half of cotton per acre!

That's what comes from soil conservation work in soil conservation districts, with conservation-group planning and everybody working together. That little visit out into the Midway community, and previous visits to other communities in many other parts of the country, convinces me that the forks-of-the-creek neighborhoods and other compact groups of farmers are the backbone of America, the solidest thing we have.

Let's everybody push these neighborhood or group efforts all over the country, and get behind their leaders—assist soil conservation district supervisors they call them in many localities.

The accompanying charts of a 62-acre farm, in the hill country near Spartanburg, S. C., show (1) the former land use on the farm, (2) the land capability classes, and (3) the farm plan for permanent conservation of the soil and for saving rainfall.

I had the opportunity to go over this farm when, on November 14, 1945, it was presented by his appreciative neighbors to Corporal Eugene Atkins, recipient of the Congressional Medal of Honor for heroic deeds in the Battle of Luzon.

This farm plan illustrates what we mean by "farm planning." Those who went over the farm that November day had no difficulty seeing and understanding what this modern on-the-ground blueprinting for conservation and prudent land use really means—how the use of the land and provisions for its protection against impoverishing erosion are made to fit the kind of land that nature has developed here. The scientific fitting of farming methods to the land was especially easy to see and understand in this case. This was because the technicians of the Soil Conservation Service, cooperating with the Broad River Soil Conservation District, hadn't been satisfied with turning over to Corporal Atkins just a planned farm. They had gone ahead and carried out every detail of work provided for in the plan that the season permitted. The terraces were all built, the strip-cropping system was laid out and seeded or prepared for seeding, stabilized waterways were provided for, steep slopes planted to trees, a fishpond was installed, and so on.

Atkins listens while District Conservationist Talbert explains that steep land like this should be in perennials, not cotton. This area is planned for lespedeza sericea, a deep-rooted hay or grazing crop—a heavy-duty plant excellent for erosion control.

Previously, Jackson Bennett had made a land-capability survey of the farm, and then, with this map (map No. 2) in their hands, Corporal Atkins and District Conservationist J. H. Talbert had gone over every part of the tract, working out cooperatively just what should, and could, and would be done to keep the many different kinds of land permanently safe and permanently productive.

Going over a farm thus treated for permanency and continuing productivity, whether that farm is in the red hills of Georgia or the brown hills in the Palouse wheatlands of Washington State, is the best possible way to see readily just what modern soil conservation is—how it works out in a practical farm way and how *nature made it so that there can not possibly be any other way to put permanent conservation on the land.* And it should be added that *not only is this the one way the job can be done, but it is the cheapest way it can be done, and the most rewarding.*

We can say these things now, since thousands of farms embracing some 30 million acres of land already have been completely treated by the Service cooperating with soil conservation districts throughout the country—and at a Service cost of much less than $2 an acre for everything—overhead, travel, salaries of technicians, supporting nursery and experimental work, and everything else the Service has put into the job.

Today as we begin another year's work on the land we are all proud of these almost unbelievable accomplishments in soil conservation. We are also proud that America has taken leadership of the world in soil conservation work. Upon this work the whole welfare of man here on earth depends. Upon it hangs the fate of hungry people in countries where the productivity of the land—the source of life—has been needlessly permitted to wane to the level of malnutrition and recurring famines.

"WHAT OF ALASKA?"

(*Continued from page* 152)

ing spirit can be given full play. New land is important to land-hungry people during the shift from war to peace. Seven million acres of agricultural land for returning veterans and other peoples displaced by war is an extremely important national backlog. It can be the basis for, and a means of, a new and better life for thousands of American families. It becomes even more important when we view these agricultural developments as being but one segment of Alaska's vast potentiality in industry and business. Future farms in Alaska will range from small subsistence units on which many will choose to live to the larger livestock ranches which will unquestionably come where range land and other resources permit. But whether they are 300 or 3,000 acres, those farms tomorrow can be satisfactory homes for Americans if carefully chosen and wisely used.

A Problem of "Antler Roo

By Paul M. Scheffer and Richard M. Bond

FENCE lines down, hay stacks overturned and destroyed, thousands of acres of range land trampled and scarred, silt-laden water rushing from eroding hillsides toward irrigation reservoirs! This is the picture confronting Wenas Valley ranchers in central Washington each spring as they watch a herd of elk trailing over the ridges rimming the valley.

It all started back in 1913. To provide better hunting, a group of sportsmen introduced 57 elk—7 bulls and 50 cows—in an area several ridges away from what is now the Wenas Valley Soil Conservation District. These elk apparently found environmental conditions in their new Cascade Mountains refuge about the same as their former habitat in Yellowstone Park. Within a few years, an increase in the numbers of elk was noticed, and there followed a steadily accelerated increase in population until the original herd had been doubled and redoubled many times. In 1921, 8 years after the original planting, the herd was estimated to have reached a size of about 450 animals. By 1931, this number had increased to 3,100. A 1945 pre-hunting season census has not been made. It is not unreasonable to believe, however, that the elk—called the Yakima elk herd—now number around 6,000 individuals, despite the fact that an equal number have been removed from the herd by legal hunting in the past 18 years. Population number is a point that can be argued, but as will be shown later, it is of little consequence, in that there are too many elk in the herd regardless of its present exact size.

As the population of the Yakima elk herd increased, more "antler room" was needed. The original range of a relatively few acres was extended to include an area of approximately 1 million acres of range lands on the eastern slopes of the Cascade Mountains. About two-thirds of this land is summer range for both domestic livestock and big game.

It was in the winter of 1922 that the elk first found their way into the Wenas Valley—15 or 20 miles from their refuge boundary. They plodded

NOTE.—This article is based on factual information obtained from a technical survey report prepared in 1944 by the Soil Conservation Service at the request of the Wenas Valley Soil Conservation Board of Supervisors. The authors are, respectively, assistant chief, biology division, Washington, D. C., and chief regional biology division, Portland, Oreg.

In an effort to prevent starvation, the limited natural winter food supply of the Yakima elk herd is supplemented by the undesirable practice of feeding cured alfalfa hay

The Wenas Valley is not unlike many other valleys in the mountainous northwest where farmers and ranchers have organized for a common cause—the protection of fertile bottom lands, irrigation storage reservoirs, and mountainous livestock ranges from the ravages of soil erosion.

down through unusually heavy snows to the bottom lands. And they were hungry.

There passed several mild winters, when only an occasional elk or small band was observed feeding around the stacked hay or on the exposed range areas of the lower mountain slopes. The ranchers

and their families were fascinated by the sight of wild game animals weighing up to 600 or 700 pounds trailing through their farmsteads. They gave little thought to the fact that the mature cow elk would return the following year with calves and that these calves would be back within 4 years with their progeny. A few of the ranchers saw the handwriting on the wall as early as the winter of 1925, when minor losses from elk depredations were noted.

The Yakima elk herd had never held such a convention as it did in the Wenas Valley in the severe winter of 1938. Most of the caucuses took place around numerous haystacks scattered along a 10-mile stretch of the narrow valley. One "committee meeting" was held in Otis Rosenbush's barn, and 30 tons of cured alfalfa hay was consumed before the meeting was concluded. Fences were hastily thrown up to protect haystacks, only to be torn down by hungry elk the next night. Dogs were chained near the stacks, but the elks' pangs of hunger were stronger than the fear of the guard's bark. Many ranchers resorted to spending uncomfortably cold nights in tents pitched on the lee side of their haystacks. Here, they catnapped with a Winchester within easy reach; the more hay they saved, the less they would have to buy and haul in for their stock.

This same story was repeated on a greatly increased scale in January and February of 1943, when about 1,000 elk wintered in Wenas Valley. Although a definite indication that the elk lacked sufficient natural winter range was shown by their concentrations around haystacks, this fact was further evidenced by the weakened condition of the animals. Sunday afternoon rodeos were held, and small boys rode a few starved critters while their older brothers roped and branded some of the less weakened individuals.

From technical studies made of forage conditions on the summer range lands of the Yakima elk herd, it is questionable whether the elk are able to put themselves in condition during the summer months to be able to withstand the privations encountered during the severe winter in the Wenas Valley. It is certain that the elk on some of the summer range areas do not find enough feed to be able to spend much time chewing their cud. This accounts for a considerable proportion of elk coming to their winter concentration areas in a not-too-good condition—a condition that should alarm the sportsmen for what it forecasts. Let's follow the spring migration of elk out of the Wenas Valley back to the summer ranges and see what is happening on those areas.

As the winter snows begin to melt from the Wenas Valley slopes, the elk begin their return migration to the summer ranges. They follow the gradually receding snow line, and feed on plants exposed only a few days previously by action of the mild spring weather. This period is an extremely critical one for plant growth. The grass and other plants on the lower ranges do not mature until about June 1, but the elk generally are grazing these areas in February or March. In the higher elevations, the forage matures and is eaten by the elk at correspondingly later dates. During the early stages of growth, the plants cannot be grazed unrestrictedly without serious injury. Such injury often results in near denudation of the grazed area and, in a few years, the complete extermination of the desirable forage species. Because of the heavy concentrations of foraging elk that habitually range just below the receding snowline, damage of this type is widespread in the Wenas Valley.

In addition to the injury to forage plants during the spring and early summer, the heavy-bodied elk plow up the wet, soft soil as they trail and trample about in search of feed. As Don Warnick, one of the Wenas Valley ranchers, put it "What grass the elk don't eat they push a foot or two into the mud with their hoofs. This may be somewhat of an exaggeration but the fact remains that of the 127,000 acres of range lands in the Wenas Valley, approximately one-half, or 60,000 acres, are grazed by the elk." Observations of range examiners show that the elk consume or destroy about one-third of the annual production of perennial forage on this area. This is one of the problems that Roy Longmire, the Coffin Brothers and other soil conservation minded Wenas Valley ranchers must contend with in the protection of their lands. There are other problems.

We have now followed the elk up to an elevation of four or five thousand feet and have another two or three thousand feet more to go before reaching the upper limits of the summer range. This range is outside of the Wenas Valley, but it is grazed by livestock from this and other areas. We are right behind the elk, but we are still two or three months ahead of the cattle and sheep that will follow—grazing the same areas and looking for the same

When the protective covering is stripped away by sharp hoofs and grinding jaws, soil erosion takes its toll. Soil from areas such as this is reducing the water-storage capacity of the Wenas Valley irrigation reservoir.

feed, but at a time when use of the range is proper. We cross Rocky Prairie and go over Bald Mountain and follow the slopes and ridge high above the Naches River to the summit of the Cascade Range. Then we go under the eastern crest of the Cascades through alpine parks and cirques, criss-crossing mountain meadows and open slopes and finally descending the pine-shadowed trails leading down the Tieton River. This trip has taken us through 700,000 acres of domestic livestock and big game summer range with evidence of range abuse and deterioration almost at every turn in our trail.

We have seen that the condition of the summer ranges varies from good in a few local areas, such as Conrad Meadows, to complete destruction in a few other places like Bethel Ridge and the Wildcat Creek area. The condition of the summer range as a whole is from fair to poor and is getting worse. The range areas in poorest condition are producing one-tenth or less of the forage they formerly did and generally coincide with the areas of greatest elk summer concentration. Occasionally we passed small plots set up by the Forest Service to study the utilization of summer range by elk. The evidence that drastic action needs to be taken to relieve this overuse was damningly clear at these points.

We did not overlook the toll that soil erosion is taking on lands that are being stripped of their protective covering by sharp hoofs and grinding jaws. Soil erosion in various stages of severity is occurring in all of the over-grazed areas of the Yakima elk herd range. The critical areas coincide with areas where the vegetation has been most depleted. Here, 75 to 100 percent of the topsoil and 25 percent of the subsoil has been lost—much of it down streams and rivers to settle into the Wenas Valley reservoir and other important irrigation water storage areas.

Before we get out of the mountains, let's stop and get some first-hand information from Arnold Arneson and Horace Cooper, United States Forest Service District Rangers. They are very much concerned about the problem, inasmuch as they represent the Government agency responsible for the protection of the resources on the area where the Yakima elk herd ranges. These men paint

Bethel Ridge was originally overgrazed by domestic stock but has been badly abused by elk of the Yakima herd since 1920. Sage brush and weeds have replaced valuable forage plants. Note the high-skirted aspen trees.

Conrad Meadows is only slightly used by elk of the Yakima herd. Thus, proper range management practices can be effected. Note abundant palatable grass remaining after domestic livestock use.

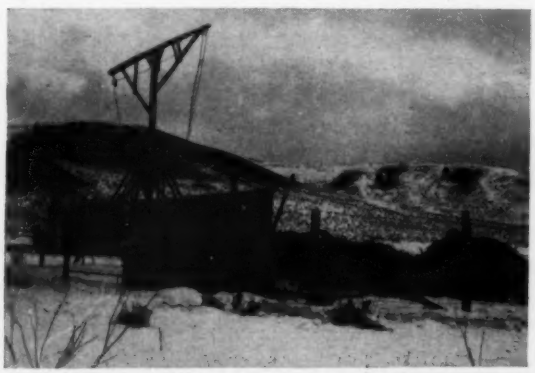
a rather disturbing picture by showing us the records of domestic livestock use of range lands in their districts. These records illustrate the deterioration of the summer range areas of the Yakima elk herd.

"In 1927, for example," Cooper tells us, "there were 3,120 cattle and 25,110 sheep grazing on the summer ranges now used by the elk. Because of the accelerating decrease in carrying capacity, it was found necessary to make a reduction in the numbers of livestock permitted on the range. In 1942, the cattle had been cut to 1,228 head and the sheep to 8,492 animals—a reduction of 74 percent

in 15 years. The Federal Land bank says that it will be economically impossible for the owners of this livestock to operate if further reductions are made.

"In 1937, we made a detailed survey of the range lands used by domestic stock," Cooper continues, "to determine their livestock carrying capacity. The capacity or safe use of the range was found to be about 18,300 animal unit months (1 cow or 5 sheep or 4/5 elk grazing for a period of 1 month equal 1 animal unit month). Range utilization by domestic livestock at that time was 13,000 animal months, or 29 percent below carrying capacity. Elk use of the domestic stock range has been so heavy that since that time it has been necessary for the Forest Service to reduce the permitted livestock by 3,250 sheep. This lighter use of the range is still above the carrying capacity due to the dual use by both wildlife and domestic stock. Unless there is a reduction in the elk numbers it will be necessary to further reduce the domestic stock."

"We can't blame this all on the elk," Mr. Arneson interrupts, "and that point should be made very, very clear. The deterioration of range lands



Many Wenas Valley ranchers resort to sleeping near their hay stacks to prevent losses of valuable livestock feed by marauding elk driven from their ranges by lack of natural winter feed.

occupied by the Yakima elk herd originally was brought about through overstocking and improper management of domestic livestock during World War I. Although the utilization of the ranges by domestic livestock has been drastically reduced, the present deteriorated condition of the grazing areas is being maintained and further aggravated as a result of continued over-utilization by the combination of domestic stock and elk. The trend of the Forest Service range policies has been to attempt to adjust the numbers of grazing livestock to numbers that can be maintained on a sustained yield basis. No one, however, has been able to control the grazing of the elk."

To get back to the Wenas Valley: Roy Knowles, chairman of the Wenas Valley Soil Conservation District board of supervisors, and other members of that group have not been twiddling their thumbs while watching the elk eat hay stacks and strip the vegetation from the ranges. These men reasoned that their district was organized to protect the land resources of the valley, and the elk, although not originally responsible for their erosion problems, were preventing the farmers and ranchers from fully applying the badly needed, complete conservation program. In order that their range lands might be permitted to recover, it would be necessary to strictly regulate grazing use. The supervisors further reasoned, however, that the most intensive domestic livestock management program designed for the recovery and protection of the forage resources, in the absence of equally intensive elk management, would not solve their problem. Chairman Knowles concluded a meeting called to discuss this matter with the admonition that "something has got to be done!" And something was done.

In 1943, competent wildlife and range techni-

When local big-game populations overbalance their natural feed resources, it is wise management to remove the surplus animals. These three elk from the Wenas Valley provided nearly 1,000 pounds of choice venison to supplement a war-rationed meat supply.

cians made a detailed study of the Wenas Valley elk problem. The factual information obtained from this study served as the basis for a management program proposed by the district's supervisory board to the Washington State Game Commission. The commission hastened to adopt some of the recommendations made by the district. First of all, hunting regulations were relaxed; and, in the last 2 seasons nearly 2,000 of the huge elk went to sportsmens' tables to supplement a war-rationed domestic meat supply. About one-third of this meat came from special hunts authorized in the Wenas Valley.

The second step taken was to divert wintering elk from the farm lands in the Wenas Valley. Feeding yards were established at advantageous points along game trails leading to the valley. Many tons of hay were hauled to these stations. The big Oak Creek winter refuge was established a few miles away, and hundreds of the animals were held in this area. As a final precaution, strong fences were built around haystacks by the Game Commission to protect the ranchers' valuable winter livestock feed supplies.

A problem yet remains on the spring and summer range lands of the Wenas Valley. These areas, of some value even in poor condition, are being destroyed at an alarming rate. The cause—forced overgrazing by domestic stock following the elk, and abuse of the forage resources by elk during periods of improper use. The first cause can be eliminated and the second mitigated. This does not call for a slaughter of the entire Yakima elk herd. The Wenas Valley ranchers do not want that. Recent range surveys have established a winter carrying capacity of about 150 elk in the Wenas Valley. If the elk population in the valley is to be reduced and held to this number, a corresponding reduction must be made in the entire herd.

The impact of grazing on the Yakima elk herd range, if continued at the present rate of use, can lead to only one thing—disaster to the elk, to the domestic stock and to the range itself. The pressure must be relieved. When this has been accomplished, the recovery of the range to normal forage production capacity, and the future profitable use of the area on a sustained forage yield basis for both domestic livestock and elk is assured. And the farmers and ranchers of the Wenas Valley Soil Conservation District can reach their goal—total conservation of their soil resources.

REVIEWS

FOOD OR FAMINE. THE CHALLENGE OF EROSION. By Ward Shepard. 224 pp. The Macmillan Co. $3.00.

Few writers on the problems of food and agriculture which confront the modern world have gone so directly to the core of the matter as has Ward Shepard in this book. He does not waste much time on depicting the effects of erosion resulting from the tremendous pressures of industrial society and laissez-faire individualism on the land. This has been done often and well. His basic concern is to show that a veritable revolution is needed in organizing agriculture to cope with the major difficulties of stabilizing food supply and of bringing about the economic and social security of the people on the land. His book deals with the broad outlines of a global attack on our disorganized lands and waters. Moreover, it is unquestionably based on the assumption that half-measures are not enough.

Here we have the much needed challenge to undertake as a whole people an integrated public policy for total conservation. Ward Shepard is thinking in the terms of modern biological principles, and he brings to his writing a rich background of experience both in the Department of Agriculture and at Harvard. He is well aware that "the farmer of the future must be a biologist and an ecologist, not a food mechanic." But he is also quite clear on the fact that our age demands a new educational approach and new social techniques.

Perhaps the most valuable contribution of *Food or Famine* is its analysis of our American experiment in the realm of democratic control of modern technology in the field of agriculture. The meaning of the soil conservation district has seldom been so well defined. The Shepard book conceives it as "the architype of the coming economy democracy, being at once the answer to the disorganized drift of laissez-faire, and to the lethal coercion of authoritarianism." And certainly its record of adoption and use by the people so far would refute the often accepted idea that the masses of men are too tradition-bound and incapable of making use of the highest technological advances.

The soil conservation district is cooperative social action. Rural people, when uninterfered with by those who would maintain positions of privilege or who fear democratic action, have eagerly responded to this kind of institutional framework. The analysis in this book is thus based upon the assumption that the people themselves, working with scientific technicians, must and can bring about the revolution in land management.

STARTS THE YEAR RIGHT. On December 27 the supervisors of the Waldo County Soil Conservation District, Belfast, Maine, sent a check for $75 to the Superintendent of Documents, Government Printing Office, Washington, D. C., in payment for 100 subscriptions to *Soil Conservation* sent to a single address. They will be distributed each month to "farmer clients and others in Waldo County."

Moreover, a management plan is the basis of the new thinking about the whole problem. Whether held by a single farmer for enabling him to reach his economic and conservation goals, or by a group of farmers in a district, or by the Nation, it is imperative henceforth, according to Ward Shepard, that "the problem of land management be approached as a whole, and not in the usual fragmentary way. The farm-management plan is the key to and the tool for the scientific reorganization of world agriculture. It is the only means of meeting the farmer's needs for a completely coherent scientific agriculture. It is the only way to protect the general public interest in natural resources. It is the irreducible minimum in reorganizing world agriculture to meet world nutritional needs."

These are positive, challenging statements and perhaps both the fervor and the clear thinking of Mr. Shepard's book will go far toward throwing necessary light on Government policy or educational methods which are based on outworn, nineteenth-century ideas of nature and science. Our times and our knowledge and our problems demand an integrated approach. The small upland watershed, the soil conservation district, the river valley—these are the areas on which the new land-use policy must be based. They lend themselves to community, cooperative action, and river valley authorities like the TVA and soil and forest conservation districts "represent revolutionary administrative concepts in substituting unitary action for fragmentary action in dealing with natural forces and resources."

Moreover, Mr. Shepard is quite clear that if we are to have new techniques of land management we must have a new educational approach. The "extension" or project method is made antiquated by the development of modern science, and by our social and economic needs. It puts a premium on over specialization, and "it has overwhelmingly dealt with single, isolated scientific practices rather than with the whole series of correlated and articulated practices which, combined into a unified whole, constitute scientific management." Certainly we need an education for farmers which will no longer be the doling out of scientific knowledge to a few, and Mr. Shepard has done a valuable service in pointing out the need for a drastic overhauling of agricultural education in terms of the needs of a total and modern land management policy.

This book should have wide reading in Government circles as well as by the public. It lacks, perhaps, some lightness of touch and humor and one is at times overwhelmed by the terrific urgency with which it has been written. But this is a subject about which there is terrific urgency. There is not as much time, no doubt, as we would like to think, and Mr. Shepard has made this point exceedingly clear.

—P. Alston Waring

TREES, SHRUBS, AND VINES FOR THE NORTHEASTERN UNITED STATES. By George Graves. 267 pages, 68 figures and halftones. Oxford University Press, New York. 1945.

This compact, pocket-sized volume contains a brief discussion of the woody plants, both wild and cultivated, for the entire northeastern quarter of the United States, listed in alphabetical order. It is primarily designed for the gardener, but should prove of considerable interest for anyone interested in the use of woody plants. Issued under the auspices of the Massachusetts Horticultural Society and written by the associate editor of Horticulture magazine, the book is authoritative in the fullest sense.

The format is especially good. Measuring 4½ by 7½ inches in size and three-fourths of an inch thick, the book is admirably prepared for pocketing. The plates are profusely supplied and are a credit to author and publisher alike. Common and Latin names are both listed so that layman or scientist can use the book. Altogether one of the best things of its kind so far published.

—William R. Van Dersal

NEW USE FOR CONTOUR FARMING

A brand new benefit has been added to the many known advantages of contour farming.

When Ben Meyer of Red Wing, Minn., planted one field of corn on the contour last year, the rows went out one side of a ridge and came back on the other side in the form of a large "U." While he and the hired man were husking the heavy crops of corn in the fall, a little whirlwind blew up behind the latter's team and started a full-fledged run-away.

Meyer took one look at the fleeing team, cut across the ridge and caught the frightened horses as they came racing down the contoured corn rows on the other side.

"Besides holding my topsoil and saving (wear on) my tractor," Meyer said in reporting the incident, "I figure that contouring saved me the price of a new wagon and a high price harness repair bill."

REFERENCE LIST ☆☆

Compiled by William L. Robey, Printing & Distribution Unit

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SOIL CONSERVATION SERVICE

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[1] From the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Many outstanding farmers include this magazine in their soil conservation program. *Soil Conservation* may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at $1 per year.

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